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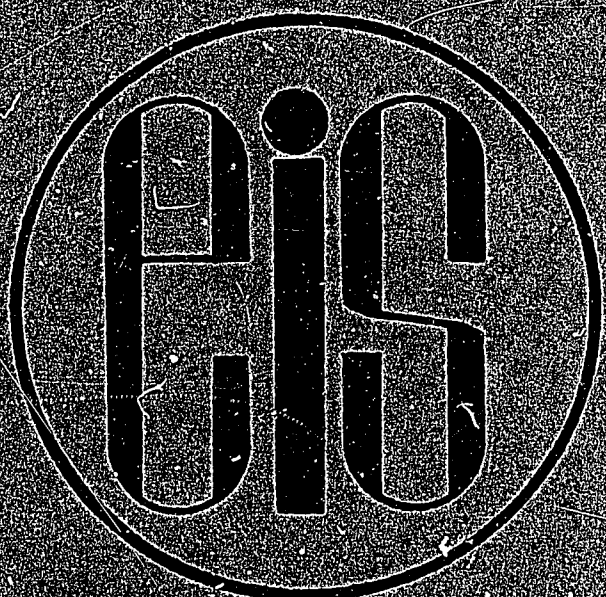
ABSTRACT

A survey was conducted to determine the extent to which electronic data processing (EDP) equipment is used by state education agencies, to define the applications being made of EDP equipment by state education agencies, and to estimate future activities required of state education agencies for systematic analysis of management information. The information was collected via telephone survey, personal interview, and content analysis of government documents. It was found that: 54% of the states have an onboard computer; 30% of the state education agencies use the state computer; 90% of the state education agencies have a computer available for data processing; 59% of the states use IBM equipment; the average annual cost for computer services is $309,000; and the four most common computer applications are teacher certification, apportionment of state funds, budget accounting for school districts, and personnel files for school districts. The results of the survey suggest that state education agencies must consider ways in which each one can retain current and accurate statistical, financial, and demographic information to reduce reporting requirements in local schools. (Author/JY)

Nationwide Survey of DATA PROCESSING in State Education Agencies



educational information systems

Mid-continent Regional Educational Laboratory

NATIONWIDE SURVEY OF DATA PROCESSING IN STATE EDUCATION AGENCIES

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The Problem

During its 1970 session, the state legislature of Kansas established the School Practices Efficiency Committee, a subcommittee empowered by a concurrent senate resolution:

> . . . providing for a joint legislative committee (with legislator and non-legislator members) to study the efficiency of certain aspects of elementary and secondary public education, and in general the possibilities for more reasonable economy of school administration and operation at the elementary-secondary level, and providing for a report upon such study to the 1971 session of the legislature.
>
> (Senate of the State of Kansas, 1970)

The committee met monthly throughout 1970, conducting hearings on selected areas in education. A factor that seemed to pervade each of the hearings was the overall lack of adequate information for decision making. Therefore, the committee requested a hearing on the status of educational information within the state of Kansas and in other states across the nation.

Because of its tremendous volume, availability of educational information within a given state is highly dependent upon the accessibility of electronic data processing to the state education agency. Accordingly, a survey of electronic data processing capabilities in state education agencies, the results of which are discussed in the following report, was conducted on a nationwide basis.

The study conducted had the following objectives: (a) to determine the extent to which data processing is used by state education agencies; (b) to obtain an estimate of annual expenditures by state education agencies for data processing; (c) to define applications of data processing equipment by state education agencies; and (d) to estimate future activities required of state education agencies for systematic analysis of management information.

Survey results were limited by a number of factors: (a) collection of data was limited by a demanding schedule, and there was only limited opportunity to update or verify any inaccurate information obtained; (b) the unavailability of information in certain state education agencies and the lack of response of a number of interviewees limited the extent of the survey; (c) use of the telephone as a data collection tool limited the length and extent of information obtained by the interviewer; and (d) the state of flux of electronic data processing activities in state education agencies limits the currentness of the study.

The following report is organized into three basic sections according to area of information. The first section deals with the survey method and deals with the analytic tools, data sources, and analytic procedures used in the study. The second section deals with telephone survey findings; the third summarizes overall findings and results. Pertinent tables, a list of states from which information was obtained by personal interview, and a list of characteristics of computers currently in use in state education agencies are included as appendixes.

Method

Analytic Tools

The principal data collection tool used was the telephone interview. The interviews were conducted by a female psychologist/educator within a one-week period of time, and a semi-structured interview format was developed for recording information (Fig. 1). The interview format contained space for recording (a) the model of computer(s) used by a state, (b) annual rental or the purchase price of the computer, (c) number of personnel involved in data processing, (d) annual cost for personnel, (e) computer use not under the direct control of the state education agency, (f) total annual budget for data processing including personnel, equipment rental, maintenance and supplies, and (g) applications for which data processing is employed. With this information, it was possible to determine the extent to which data processing equipment is used and the applications being made of it by state education agencies.

A second tool employed in this investigation was the unstructured personal interview. These interviews were conducted by a male educational psychologist during the months of June through September, 1970 to obtain an overview of current data processing activities among the states. It must be underscored that the purpose of this part of the data collection was not to gather detailed statements by state, but to obtain a general view of data processing activities.

A third tool used was content analysis. Types of documents analyzed were (a) federal documents which are placing or will place requirements for educational information upon state education agencies and local school districts; (b) state documents which respond to federal, state, and local requirements; and (c) state and federal statistical documents which contain comparative information. The intent of these analyses was to obtain an overview of future requirements for educational information.

Data Sources

First, telephone interviews were attempted in all of the 50 states, and staff responsible for data processing and finance were contacted in the state education agencies.

EDP SURVEY OF STATES - TELEPHONE INTERVIEW QUESTIONNAIRE

Date: _____

1. Does the Department of Education use data processing facilities? (Use own computer or another facility?)

2. What types of computer equipment are used by the Department? (Manufacturer/model)

3. Is the equipment solely the Department's or is it shared by other governmental agencies? (explain)

4. What tasks are performed by the computer? (List applications)

5. How much is spent annually for computer equipment?

6. How many full-time people are employed in data processing?

7. What is your annual cost for data processing personnel?

8. What is your annual cost for outside data processing services?

9. What other annual data processing costs have you?

10. What is the Department's annual budget for data processing?

Fig. 1. The telephone interview format used for collecting information about data processing in state education agencies throughout the United States.

Secondly, personal interviews were conducted with state education agency staff working in the areas of planning and research, and states were selected on a random basis. Since the intent of the personal interviews was to obtain an overview of data processing activities in states, not all states were contacted for this particular purpose. States contacted are listed in Appendix B.

Analytic Procedures

Data analysis necessitated only simple tabulation of the data items and the use of such descriptive statistics as frequencies, means, medians, modes, quartiles, and percentages.

Findings

Telephone Interview

Of the 49 state education agencies contacted for the general survey, complete information was available for 43. Complete information was not available for California, Connecticut, Minnesota, Montana, Nebraska, North Carolina, and Rhode Island. The following information was obtained from these interviews.

The use made of computers by state is reported in Table[1] 1. It can be seen that (a) 27 of 50 state education agencies (54%) have an onboard computer; (b) one of 50 state education agencies (2%), Louisiana, reported having no computer available; (c) 15 of 50 state education agencies (30%) have the use of a state computer; (d) six of 50 state education agencies (12%) indicated that they had use of some other computer facility; (e) five of 50 state education agencies (10%) have the use of more than one computer; (f) no information was available for three state education agencies (6%); and (g) it was not possible to contact the appropriate person in one state (Connecticut). Forty-five of 50 state education agencies where information was available, or 90% of them, reported having a computer available for data processing. The Kansas state education agency uses the Department of Administration's computer.

The different models of computers used by state education agencies have been tabulated in Table 2, and the comparative specifications of computer models have been reported in Appendix C. It can be seen that 59% of the state education agencies use computers produced by International Business Machines, 14% use Honeywell computers, 10% use Radio Corporation of America computers, 8% use Univac computers, and 8% use computers produced by other manufacturers.

Estimated costs for data processing by state are reported in Table 3. These costs are broken into five categories: equipment, personnel, outside services, and other. The estimated mean, median, and range of data processing costs for state education agencies is reported in Table 4. The

[1] All tables are presented in Appendix A.

average annual cost for equipment is $114,215; for personnel, $164.371; for outside services, $46,599; for other costs, $62,612; with total average annual costs being $309,006. These average cost figures can be important to a state education agency planning to obtain onboard data processing capability. The average costs can be used for planning figures in developing an initial budget. A state education agency may find the median figures of greater value, as they are more representative of actual state education agency costs than are average figures. At any rate, both figures are reported, and the reader can decide which set of figures is more useful to him.

The range is sometimes an important statistic for indicating the spread of costs among state education agencies, and these figures have been reported. Table 5 reports the estimated data processing costs for states falling in the first and fourth quartiles, based upon total data processing costs. Some trends can be noted from Table 5. For example, (a) none of the states falling within the first quartile spent money for outside services, while the majority of the states in the fourth quartile spent money for outside services, while the majority of the states in the fourth quartile used outside data processing services; (b) two of the states in the first quartile, Pennsylvania and Massachusetts, purchased their computers, while this did not occur among states in the fourth quartile; and (c) the majority of the states in the fourth quartile do not have an onboard computer.

Oftentimes, a state education agency may know what equipment it requires, but have some difficulty in estimating personnel costs and other associated costs. The figures reported in Table 4 can be used to obtain cost ratios useful in answering other planning questions. The estimated ratio of personnel costs to equipment costs is 1.4::1. A state education agency must plan to spend for personnel services 1.4 times the estimated costs for equipment. Since this function is not linear, this ratio is not totally accurate. Smaller computer facilities usually spend proportionately more for personnel than medium-sized facilities; larger computer facilities usually spend proportionately less for personnel. In addition, this ratio does not take into consideration the difference in the efficiency of operation of computer facilities. Neither does it show that a computer facility probably is not efficient in its early operation but increases in efficiency as time passes.

The ratio of other associated costs to equipment costs is .87::1, and the ratio of total costs to equipment costs is 2.7::1. There has been much discussion among specialists in the computer industry about costs. It must be pointed out that the ratios reported herein are based upon the actual experience of state education agencies, as reported during the survey.

The estimated per pupil expenditure by state for data processing has been reported in Table 6, and the estimated mean, median, and range of per pupil expenditure for data processing in Kansas was 19 cents, which is considerably below both the mean and the median expenditures. The estimated data processing costs for states in the first and fourth quartiles, based upon per pupil expenditure, are reported in Table 8. Utah and Alaska ranked first and second respectively with per pupil

expenditures of $2.25 and $2.10. Hawaii and Louisiana ranked 42.5 with no expenditures listed, and Kansas ranked 35.

Applications of data processing by state education agencies are listed in Table 9. The four most common applications are teacher certification, apportionment of state funds, budget accounting for school districts, and personnel files for school districts. In several instances the state education agency provides computer services for local school districts. Examples are budget accounting, personnel files, and attendance records.

Major federal reporting considerations reviewed were the Consolidated Program Information Report, the Pupil Centered Instrument for Elementary Students, the Pupil C ıtered Instrument for Secondary Students, the Program Descriptor Instrument, the Common Status Measures, and the Management Appraisal System, all of which form the instrumentation of the Joint Federal/State Task Force on Evaluation; the State Education Records and Reports Series of the National Center for Educational Statistics; and federal legislation for the Elementary and Secondary Education Act, the National Defense Education Act, and the Vocational Education Amendments.

These reviews suggest that the need for reporting statistical, financial, and demographic information is increasing while the need for narrative reports is decreasing. The Consolidated Program Information Report requires more than 1100 types of quantitative information for its completion. Sixty-nine school districts in Kansas completed this report during the 1969-70 school year, and 79 school districts are scheduled to participate during the 1970-71 school year.

Summary

The purpose of this investigation was (a) to determine the extent to which data processing equipment is used by state education agencies, (b) to obtain an estimate of the annual expenditures for data processing by state education agencies, (c) to define the applications being made of data processing equipment by state education agencies, and (d) to estimate future activities required of state education agencies for systematic analysis of management information.

The information was collected via telephone survey, personal interview, and content analysis of documents.

It was found that:

1. Fifty-four percent of the states have an onboard computer.

2. One state education agency does not have the use of computer facilities.

3. Thirty percent of the state education agencies use the state computer.

4. Ninety percent of the state education agencies have a computer available for data processing.

5. Fifty-nine percent of the states use IBM equipment.

6. The average annual cost for computer equipment is $114,215; for personnel, $164,371; for outside services, $46,599; for other necessities, $52,612. The average annual total cost is $309,006.

7. The ratio of personnel costs to equipment costs is 1.4::1, for other associated costs to equipment costs it is .87::1, and for total costs to equipment costs it is 2.7::1.

8. The average annual per pupil expenditure for data processing is 46 cents, while the range is from six cents to $2.25 per pupil.

9. The four most common computer applications were teacher certification, apportionment of state funds, budget accounting for school districts, and personnel files for school districts.

10. Requirements for reporting statistical, financial, and demographic information to the federal government is increasing, while requirements for narrative reports are decreasing.

11. For the future, state education agencies must consider ways in which each one can retain current and accurate statistical, financial, and demographic information to reduce reporting requirements in local schools. In collecting this information, consideration must be given to needs for (a) comparing data items across school districts, (b) comparing data items from state to state, and (c) selecting small samples of the population while minimizing sampling error and maximizing reliability and validity.

References

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Martell, J. G. (Ed.) Computer Characteristics Review, 10 (1). 1970, pp. 1-59.

The Senate of the State of Kansas. Senate Concurrent Resolution No. 63. Topeka, Kansas; Legislative Research Council, 1970.

APPENDIXES

APPENDIX A

TABLES

Table 1

COMPUTER AVAILABILITY BY STATE

	State	Computer[c] Availability	Computer[d] Manufacturer/Model
1.	Alabama	Own	IBM 360/40
2.	Alaska	State	IBM 360/40
3.	Arizona	Own	UV 9300
		Own	UV 1005
4.	Arkansas	Own	IBM s/360
5.	California	State	(b)
6.	Colorado	State	IBM 360/50
7.	Connecticut	(a)	(a)
8.	Delaware	Own	IBM 1401
9.	Florida	Own	IBM 360/40
10.	Georgia	Own	IBM 360/40
11.	Hawaii	State	IBM 360/50
		State	IBM 360/30
		State	IBM 1130
12.	Idaho	Colleges	IBM 1401
13.	Illinois	Own	HW 200
14.	Indiana	Own	IBM 360/40
		State	IBM 360/50
		State	RCA sp 70
15.	Iowa	Own	IBM 1401
16.	Kansas	State	RCA sp 70
17.	Kentucky	Own	HW 200
18.	Louisiana	None	None
19.	Maine	State	IBM s/360
20.	Maryland	Own	HW 200
21.	Massachusetts	Own	HW 200
22.	Michigan	Own	HW 200/1200
23.	Minnesota	(b)	(b)
24.	Mississippi	Own	HW 200
25.	Missouri	Own	IBM s/360
26.	Montana	(b)	(b)
27.	Nebraska	(b)	(b)
28.	Nevada	State	IBM 360/40
29.	New Hampshire	Tech. Inst.	GE
30.	New Jersey	Own	IBM 1401
31.	New Mexico	State	IBM 360/40 (2)
32.	New York	Own	CD 3300
33.	North Carolina	State	(b)
34.	North Dakota	State	RCA sp 70/45
35.	Ohio	with Franklin Co..	HW 200
36.	Oklahoma	with Voc. Ed.	RCA sp 70

Table 1 (Continued)

State	Computer[c] Availability	Computer[d] Manufacturer/Model
37. Oregon	With St. Hwy. Comm.	IBM 360/40
38. Pennsylvania	Own	NCR 315/100
39. Rhode Island	State	(b)
40. South Carolina	Own	RCA sp 70/55
41. South Dakota	State	IBM 360/40
42. Tennessee	Own	IBM 360/30
43. Texas	Own	UV 1005
	Own	UV 1004
44. Utah	Own	RCA sp 70.45
45. Vermont	State	IBM 360/40
46. Virginia	Own	IBM 360.25
47. Washington	Own	IBM 360/30
48. West Virginia	Own	Bur B300
49. Wisconsin	Own	IBM 360/30
50. Wyoming	State	IBM s/360

a/ Unable to Contact.
b/ Data not available.
c/ "Own" = state has an onboard computer; "state" = state education agency uses state computer.
d/ Key to Computer Manufacturer:
Bur = Burroughs
CD = Control Data
GE = General Electric
HW = Honeywell
IBM = International Business Machines
NCR = National Cash Register
RCA Sp = Radio Corporation of America Spectra
UV = Univac

Source: Telephone Survey, September 1970.

Table 2

Computer Manufacturer/Model Used by State Education Agencies (SEA's)

Manufacturer/Model	No. of SEA's		Per cent of SEA's	
	Mfr./Model	Mfr.	Mfr./Model	Mfr.
Burroughs B300	1	1	2%	2%
Control Data 3300	1	1	2%	2%
General Electric	1	1	2%	2%
Honeywell 200	6		12%	
Honeywell 200/1200	1	7	2%	14%
IBM S/360	4		8%	
IBM 360/25	1		2%	
IBM 360/30	4		8%	
IBM 360/40	11		22%	
IBM 360/50	3		6%	
IBM 1130	1		2%	
IBM 1401	5	29	10%	59%
NCR 315/100	1	1	2%	2%
RCA Spectra 70	3		6%	
RCA Spectra 70/45	1		2%	
RCA Spectra 70/55	1	5	2%	10%
Univac 1004 I	1		2%	
Univac 1005 I	2		4%	
Univac 9300	1	4	2%	8%

Source: Telephone Survey, September 1970

Table 3

Estimated Date Processing Costs by State

State	Equipment	Personnel	Outside Services	Other	Total
1. Alabama	180,000	180,000	--	--	360,000
2. Alaska	100,000	30,000	--	20,000	150,000
3. Arizona	59,160	120,000	--	20,840	200,000
4. Arkansas	79,116	40,000	--	--	119,116
5. California (b)	--	--	--	--	--
6. Colorado	--	55,000	100,000	--	155,000
7. Connecticut (a)	--	--	--	--	--
8. Delaware	48,000	60,600	--	--	108,600
9. Florida	200,000	440,000	--	160,000	800,000
10. Georgia	411,796	704,006	--	196,432	1,312,234
11. Hawaii (c)	--	--	--	--	--
12. Idaho	--	39,000	66,000	--	96,000
13. Illinois	84,000	400,000	--	166,000	650,000
14. Indiana	25,000	51,500	(+)	--	76,500
15. Iowa	72,000	180,000	--	--	252,000
16. Kansas	--	79,488	21,388	--	100,876
17. Kentucky	84,000	220,000	--	36,000	340,000
18. Louisiana (c)	--	--	--	--	--
19. Maine	--	60,000	20,400	44,600	135,000
20. Maryland	38,400	70,000	--	48,400	156,800
21. Massachusetts	30,000	200,000	--	171,000	401,000
22. Michigan	93,600	350,000	--	84,400	530,000

Table 3 (Continued)

	State	Equipment	Personnel	Outside Services	Other	Total
23.	Minnesota (b)	--	--	--	--	--
24.	Mississippi	58,320	160,000	--	65,420	283,740
25.	Missouri	74,400	170,000	--	--	244,400
26.	Montana (b)	--	--	--	--	--
27.	Nebraska (b)	--	--	--	--	--
28.	Nevada	14,000	--	--	--	14,000
29.	New Hampshire	7,000	50,000	(+)	--	57,000
30.	New Jersey	68,400	170,000	--	11,600	250,000
31.	New Mexico	24,000	50,000	9,600	6,400	90,000
32.	New York	660,000	1,000,000	--	340,000	2,000,000
33.	North Carolina (b)	--	--	--	--	--
34.	North Dakota	--	18,000	27,000	--	45,000
35.	Ohio	[300,000]	220,000	--	80,000	300,000
36.	Oklahoma	--	92,000	120,000	--	212,000
37.	Oregon	83,000	85,000	--	--	168,000
38.	Pennsylvania	52,320 [165,000]	398,754	--	198,026	650,000
39.	Rhode Island (b)	--	--	--	--	--
40.	South Carolina	384,000	130,000	--	--	514,000
41.	South Dakota	--	--	40,000	--	40,000
42.	Tennessee	[352,134]	135,000	--	63,000	198,000
43.	Texas	39,600 [580,000	249,186	--	79,201	267,987
44.	Utah	156,000	260,000	--	284,000	700,000
45.	Vermont	--	40,000	15,000	--	55,000
46.	Virginia	96,000	179,000	--	30,000	305,000

Table 3 (Continued)

State	Equipment	Personnel	Outside Services	Other	Total
47. Washington	120,000	130,000	--	--	250,000
48. West Virginia	40,000	90,000	--	70,000	200,000
49. Wisconsin	132,000	150,000	--	18,000	309,000
50. Wyoming	--	21,000	12,000	67,000	100,000

a/ Unable to contact.
b/ Data not available.
c/ State furnishes computer services. Cost information not available.
d/ [ ] = Cost of purchased computer.
e/ (+) = Special tasks may be performed on outside computers.

Source: (1) Student Population - Long, L. H. The World Almanac, New York: Doubleday and Co., Inc., 1969, p. 347. Data current to fall, 1968.
(2) Remainder - Telephone Survey, September 1970.

Table 4

Estimated Mean, Median, and Range of Data Processing Costs for State Education Agencies

	Equipment Costs	Personnel Costs	Outside Services	Other Costs	Total Costs
Mean	114,215	164,371	46,599	52,612	309,006
Median	68,400	120,000	24,200	11,600	200,000
Range	7,000 660,000	1,800 1,000,000	9,600 120,000	6,400 340,000	14,000 2,000,000

a/ Based upon information from the 43 states reporting complete data.

Table 5

Estimated Data Processing Costs for States in the First and Fourth Quartiles Based upon Total Costs

State	Rank	Equipment	Personnel	Outside Services	Other	Total
			First Quartile			
New York	1	660,000	1,000,000	--	340,000	2,000,000
Georgia	2	411,796	704,006	--	196,432	1,312,234
Florida	3	200,000	440,000	--	160,000	800,000
Utah	4	156,000	260,000	--	284,000	700,000
Illinois	5.5	84,000	400,000	--	166,000	650,000
Pennsylvania	5.5	52,320[a]	398,754	--	198,026	650,000
Michigan	7	93,600	350,000	--	86,400	530,000
South Carolina	8	384,000	130,000	--	--	514,000
Massachusetts	9	30,000	200,000	--	171,000	401,000
Texas	10	39,600[a]	249,186	--	79,201	367,987
Alabama	11	180,000	180,000	--	--	360,000
			Fourth Quartile			
Wyoming	33	--	21,000	21,000	67,000	100,000
Idaho	34	--	30,000	66,000	--	96,000
New Mexico	35	24,000	50,000	9,600	6,400	90,000
Indiana	36	25,000	51,500	--	--	76,500
New Hampshire	37	7,000	50,000	--	--	57,000
Vermont	38	--	40,000	15,000	--	55,000
North Dakota	39	--	18,000	27,000	--	45,000
South Dakota	40	--	--	40,000	--	40,000
Nevada[b]	41	14,000	--	--	--	14,000
Hawaii[c]	42.5	--	--	--	--	--
Louisiana	42.5	--	--	--	--	--

a/ Costs do not reflect the amortization of the purchase of computer equipment.

b/ The costs reported cannot be accurate, as there must be some costs incurred for personnel to operate the equipment.

c/ Costs for data processing are incurred and paid by the state and are not billed back to the state education agency.

Table 6

Estimated per Pupil Expenditures for Data Processing by State

	State	Student[d] Population	Total[e] Cost	Per Pupil Expenditures
1.	Alabama	831,661	360,000	.433
2.	Alaska	71,469	150,000	2.099
3.	Arizona	411,070	200,000	.487
4.	Arkansas	453,314	119,116	.263
5.	California	4,581,600	(a)	--
6.	Colorado	524,347	155,000	.296
7.	Connecticut	632,208	(b)	--
8.	Delaware	124,666	108,600	.871
9.	Florida	1,355,846	800,000	.590
10.	Georgia	1,103,306	1,312,234	1.189
11.	Hawaii	172,230	(c)	.000
12.	Idaho	178,900	96,000	.537
13.	Illinois	2,273,517	650,000	.286
14.	Indiana	1,205,252	76,500	.063
15.	Iowa	677,791	252,000	.372
16.	Kansas	522,211	100,876	.193
17.	Kentucky	698,790	340,000	.487
18.	Louisiana	864,765	(c)	.000
19.	Maine	232,127	135,000	.582
20.	Maryland	858,766	156,800	.183
21.	Massachusetts	1,112,461	401,000	.306

Table 6 (Continued)

State	Student[d] Population	Total[e] Cost	Per Pupil Expenditures
22. Michigan	2,123,573	530,000	.250
23. Minnesota	895,332	(a)	--
24. Mississippi	581,734	283,740	.488
25. Missouri	1,056,101	244,400	.231
26. Montant	172,768	(a)	--
27. Nebraska	328, 85	(a)	--
28. Nevada	118,236	14,000	.118
29. New Hampshire	165,706	57,000	.344
30. New Jersey	1,421,455	250,000	.176
31. New Mexico	272,567	90,000	.330
32. New York	3,411,000	2,000,000	.586
33. North Carolina	1,195,258	(a)	--
34. North Dakota	148,965	45,000	.302
35. Ohio	2,384,160	300,000	.125
36. Oklahoma	604,017	212,000	.350
37. Oregon	489.825	168,000	.343
38. Pennsylvania	2,309,700	650,000	.281
39. Rhode Island	173,393	(a)	--
40. South Carolina	648,696	514,000	.792
41. South Dakota	167,205	40,000	.239
42. Tennessee	883,500	198,000	.224
43. Texas	2,704,000	367,987	.135
44. Utah	311,116	700,000	2.250
45. Vermont	99,649	55,000	.552

Table 6 (Continued)

	State	Student[d] Population	Total[e] Cost	Per Pupil Expenditures
46.	Virginia	1,055,606	305,000	.229
47.	Washington	304,205	250,000	.300
48.	West Virginia	409,639	200,000	.488
49.	Wisconsin	954,243	300,000	.320
50.	Wyoming	86,013	100,000	1.163

a/ Data not available.
b/ Unable to contact.
c/ State furnishes computer services. Cost information not available.
d/ Source: Long, L. H. The World Almanac, New York: Doubleday and Co., Inc., 1969. p. 347.
e/ Source: Telephone Survey, September 1970.

Table 7

Estimated Mean, Median, and Range of
Per Pupil Expenditure for Data Processing for
State Education Agencies

	Student Population	Total Cost	Per Pupil Expenditure
Mean	833,637	309,006	.4617
Median	648,696	200,000	.320
Range	71,469 3,411,000	14,000 2,000,000	.063 2.250

Table 8

Estimated Data Processing Costs for States in the First and Fourth Quartiles
Based upon Per Pupil Expenditures

State	Rank	Per Pupil Expenditure	Student Population	Equipment Costs	Personnel Costs	Outside Services	Other Costs	Total Costs
				First Quartile				
Utah	1	2.250	311,116	156,000	260,000	--	284,000	700,000
Alaska	2	2.099	71,469	100,000	30,000	--	20,000	150,000
Georgia	3	1.189	1,103,306	411,796	704,006	--	196,432	1,312,234
Wyoming	4	1.163	86,013	--	21.000	12,000	67,000	100,000
Delaware	5	.871	124,666	48,000	60,600	--	--	108,600
South Carolina	6	.792	648,696	384,000	130,000	--	--	514,000
Florida	7	.590	1,355,846	200,000	440,000	--	160,000	800,000
New York	8	.586	3,411,000	660,000	1,000,000	--	340,000	2,000,000
Maine	9	.582	232,127	--	60,000	20,400	44,600	135,000
Vermont	10	.552	99,649	--	40,000	15,000	--	55,000
Idaho	11	.537	178,900	--	30,000	66,000	--	96,000
				Fourth Quartile				
Virginia	33	.229	1,055,606	96,000	179,000	--	30,000	305,000
Tennessee[a]	34	.224	883,500	[352,134]	135,000	--	63,000	198,000
Kansas	35	.193	522,211	--	79,488	21,388	--	100,876
Maryland	36	.183	858,766	38,400	70,000	--	48,400	156,800
New Jersey	37	.176	1,421,455	68,400	170,000	--	11,600	250,000
Texas[a]	38	.135	2,704,000	39,600	249,186	--	79,201	367,987
Ohio[a]	29	.125	2,384,160	[300,000]	220,000	--	80,000	300,000
Nevada[b]	40	.118	118,236	14,000	--	--	--	14,000
Indiana	41	.063	1,205,252	25,000	51,500	--	--	76,500
Hawaii[c]	42.5	.000	172,230	--	--	--	--	--
Louisiana	42.5	.000	864,765	--	--	--	--	--

a/ Total costs and per pupil expenditure do not reflect cost to purchase computer equipment.
b/ The costs reported and the related per pupil expenditure cannot be accurate, as some costs are incurred for personnel to operate the equipment.
c/ Costs for data processing are incurred and paid by the state and are not billed back to the state education agency. Therefore, the per pupil expenditure reported is not entirely accurate.

Table 9

Data Processing Applications of State Education Agencies by State in Rank Order from High to Low Frequency of Use

State \ Applications	Teacher Certification	Apportionment of State Funds	Budget Accounting for Districts	Personnel Files for Districts	School Lunch	Apportionment of Federal Funds	Attendance for Districts	Statistical Records	Rehabilitation Services	Internal Accounting	Inventory of Facilities	General Data Bank	Testing Programs	Personnel File of Staff	Internal Payroll	Textbook Allocation and Distribution	Research	Scheduling for Districts	Educational Programs	Transportation Claims	Accounting for Vocational Education	Grading for Districts	Scholarships	Backup Computer	Bussing
1. Alabama	X	X	X		X	X	X	X			X					X									
2. Alaska	X		X	X			X					X													
3. Arizona		X	X	X		X	X							X							X				
4. Arkansas										X					X										
5. California	X	X		X		X							X			X									
6. Colorado		X	X		X		X				X								X						
7. Connecticut (a)																									
8. Delaware	X	X	X	X	X	X				X	X		X		X										
9. Florida	X			X			X	X	X	X	X		X		X	X	X								
10. Georgia	X	X	X	X	X	X			X		X	X		X	X				X		X				
11. Hawaii	X	X	X	X		X				X		X	X		X			X							
12. Idaho	X	X	X			X	X	X	X				X	X											
13. Illinois		X						X							X					X					
14. Indiana	X	X	X	X			X	X		X										X					
15. Iowa	X	X	X	X	X	X	X		X	X					X	X				X					
16. Kansas	X							X																	
17. Kentucky	X	X	X			X			X					X											
18. Louisiana									X											X					
19. Maine	X		X		X						X	X						X							
20. Maryland	X		X					X		X					X										
21. Massachusetts		X				X		X						X											
22. Michigan	X		X	X					X		X			X			X						X		X
23. Minnesota (b)																									
24. Mississippi	X		X	X	X		X		X	X				X											
25. Missouri	X	X	X		X			X	X			X													

Table 9 - continued

State \ Applications	Teacher Certification	Apportionment of State Funds	Budget Accounting for Districts	Personnel Files for Districts	School Lunch	Apportionment of Federal Funds	Attendance for Districts	Statistical Records	Rehabilitation Services	Internal Accounting	Inventory of Facilities	General Data Bank	Testing Programs	Personnel File of Staff	Internal Payroll	Textbook Allocation and Distribution	Research	Scheduling for Districts	Educational Programs	Transportation Claims	Accounting for Vocational Education	Grading for Districts	Scholarships	Backup Computer	Bussing
26. Montana (b)																									
27. Nebraska (b)																									
28. Nevada	X			X			X			X		X		X											
29. New Hampshire	X	X				X																			
30. New Jersey	X	X	X	X		X		X	X				X				X								
31. New Mexico	X			X		X				X						X			X						
32. New York	X	X		X	X	X						X	X										X		
33. North Carolina	X							X			X					X									
34. North Dakota	X	X	X	X	X						X														
35. Ohio	X		X	X			X							X				X							
36. Oklahoma	X	X		X	X													X				X			
37. Oregon			X	X	X		X	X	X			X													
38. Pennsylvania		X		X	X	X		X									X								
39. Rhode Island	X	X							X		X										X				
40. South Carolina	X	X	X	X	X		X				X		X			X									
41. South Dakota	X	X		X	X			X																	
42. Tennessee		X	X		X	X			X	X															
43. Texas	X	X	X		X	X				X						X									
44. Utah	X	X	X	X		X	X											X				X			
45. Vermont	X	X	X	X			X	X			X	X		X											
46. Virginia	X	X		X	X								X												
47. Washington	X	X	X	X	X				X		X	X													
48. West Virginia	X	X	X	X	X	X							X				X		X						
49. Wisconsin	X	X	X	X	X					X		X											X		
50. Wyoming	X					X																			
Number of States	37	31	28	28	21	20	15	15	14	13	13	11	11	10	8	7	5	5	4	4	3	2	2	1	1

APPENDIX B

STATES FROM WHICH INFORMATION WAS OBTAINED VIA PERSONAL INTERVIEW

APPENDIX B

States from which Information was obtained via Personal Interview

1. Alabama
2. Alaska
3. Arizona
4. Arkansas
5. California
6. Colorado
7. Connecticut
8. Florida
9. Georgia
10. Idaho
11. Illinois
12. Iowa
13. Kansas
14. Kentucky
15. Louisiana
16. Maryland
17. Michigan
18. Minnesota
19. Missouri
20. Montana
21. Nebraska
22. Nevada
23. New Mexico
24. New York
25. Oregon
26. Pennsylvania
27. South Dakota
28. Tennessee
29. Texas
30. Utah
31. Wisconsin
32. Wyoming

APPENDIX C

CHARACTERISTICS OF COMPUTERS IN USE IN STATE EDUCATION AGENCIES

APPENDIX C

Characteristics of Computers in Use in State Education Agencies

	Price Range	Processor Speed			Internal Storage				Time Sharing						Input/ Output	
Computer Manufacturer Model	Monthly in Thousands	Complete Add Time in Microseconds	Storage cycle Time in Microseconds	Accumulators	Capacity in Thousand Words	Word Size	Floating Point Precision	Overlap	Base Address Relocation	Clock	Program Interrupt	Memory Protection	Dynamic Page Relocation	Supervisor Mode	Number of Channels	Transfer Rate in Characters per Second
Burroughs B300	4.8-14.2	414	6	--	4.8-19.2	1	--	---	-	-	-	-	-	-	1	.6m
Control Data 3300	5.5-30	2.6	1.5	1	8-262	24	36	---	X	X	X	X	X	X	4	1.8m
Honeywell 200/1200	5.4-12	34.5	1.5	1	32-262	1	36	1	X	X	X	X		X	4	.5m
IBM 360/25	3-10	45	1.8	16	16-49	1	56	---		X	X	X		X	2	1.1m
IBM 360/30	2.7-20	40	1.5	16	8-65	1	56	---		X	X	X		X	2	.4m
IBM 360/40	5-35	11.88	2.5	16	16-262	1	56	---		X	X	X		X	2	.8m
IBM 360/50	14-55	4	2	16	65-524	1	56	---		X	X	X		X	3	1.2m
IBM 1130	.6-1.6	8	2.2	4	4-32	16	--	---				X			2	?
IBM 1401	1.9-12	402	11.5	--	4-16	1	--	---				X			1	?
NCR 315/100	2.2-9.5	48	6	1	5-40	2	--	---				X			-	120k
RCA Spectra 70/45	8-30	8.88	1.44	16	16-262	1	56	---		X	X	X		X	4	1.3m
RCA Spectra 70/55	14-60	2.58	.84	16	65-524	1	56	---		X	X	X		X	6	.75m
Univac 10041	1.5-1.8	112	8	1	.961	1	--	---			X				4	20.8k
Univac 10051	1.8-2	256	8	1	2-4	1	--	---			X				4	20.8k
Univac 9300	1.7-9.3	52	.6	16	16-32	1	--	---			X				5	360k

Source: Martell, J. F. (Ed.) Computer Characteristics Review, 10 (1), 1970, pp. 1-59. For more detailed information, particularly in regard to computer architecture, see this source.